REMARKS

Claim 1-32 are pending, with claims 1-20 rejected, claims 26-32 objected to, and claims 21-25 withdrawn from consideration. Applicant thanks the Examiner for the indication of allowable subject matter in claims 26-32.

Preliminary, Applicant has amended the specification to correct the misplacement of the "Summary of the Invention" section heading, and has amended claim 1 to correct a typographical error. No new matter has been entered.

Turning to the substance of the Office Action, claims 12-20 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The amendments to claim 12, support for which may be found on page 16 of the application, are believed to overcome this rejection.

Claims 1-5 and 7-10 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Sherman et al. (U.S. Patent No. 5,735,280). Claim 6 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Sherman et al. Claim 11 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Sherman et al. in view of Benndorf et al. (U.S. Patent No. 4,689,515). Applicant respectfully traverses these rejections for the reasons set forth below.

As described in the background section of the application, traditionally, thermocouples, thermistors and other classical temperature sensors were used to measure the transducer temperature. These traditional methods increase the cost of the hand piece, and add additional wires and connections which could potentially reduce the reliability of the ultrasonic surgical system.

The present invention overcomes the problems of the traditional methods of determining transducer temperature by first determining a shunt capacitance of an ultrasonic transducer, and then using the shunt capacitance to determine the temperature. Additionally, if the temperature or rate of change of the temperature of the transducer is excessive, a warning is provided to the user of the transducer.

Sherman et al. is directed to the transfer of energy from an ultrasonic device having a catheter to biological tissue. A temperature sensor, which is mounted in the distal end of the catheter, senses temperature and provides a temperature sensing signal. (Col. 3, lines 54-62.) When the temperature goes above a predetermined threshold, a processor decreases a power drive level. (Col. 4, lines 13-16.) The temperature sensor 28, which may be a thermocouple 33, is shown in Figs. 2 and 3. (See col. 6, lines 15-16 and 41-42.)

Sherman et al. does not teach, or even suggest, determining a shunt capacitance of the transducer, or calculating the temperature of the transducer based on the shunt capacitance of the transducer, as required by the claims of the present invention. Sherman et al. senses temperature using traditional temperature sensors such as thermocouples. Thus, Sherman et al. is more like the traditional methods described in the background section of the application than like the present invention.

Contrary to the Examiner's position, cols. 15 and 16 of Sherman et al. do not teach determining temperature based on a capacitance of the transducer. The transducer and device are designed to resonate at a certain frequency. Sherman et al. describes sweeping through a frequency range in order to identify resonant frequencies of the transducer. This frequency sweep does not relate to measuring any capacitance or determining temperature. Thus the claims are patentable over Sherman for at least this reason.

Further, Sherman et al. does not teach or suggest providing a warning to a user of the hand piece if one of the temperature of the transducer and a rate of change of the temperature is excessive. Rather in Sherman et al., when the temperature goes above a predetermined threshold, a processor decreases a power drive level. The claims are therefore patentable over Sherman et al. for this additional reason.

Many of the dependent claims recite additional features of determining the shunt capacitance of the transducer, and/or of calculating the temperature of the transducer based on the shunt capacitance. Since Sherman et al. does not teach or suggest determining the shunt capacitance

or calculating the temperature of the transducer based on the shunt capacitance, it necessarily follows that Sherman et al. does not suggest these additional features. The dependent claims are therefore patentable over Sherman et al. for these additional reasons.

Regarding claim 11, the Examiner additionally applies Benndorf as allegedly teaching storing a "capacitance frequency" in memory. First, claim 11 recites that the capacitance at an off-resonance frequency is stored in memory, and not a "capacitance frequency" as asserted by the Examiner. Also, Benndorf does not teach or suggest storing a capacitance in memory, as asserted by the Examiner. Benndorf teaches storing current values. See for example, col. 2, lines 45 and 50. Thus, claim 11 is patentable over the applied references for this additional reason.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

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